

**A High Speed Optical Transmitter and Receiver with a Serializer  
with a Minimum Frequency Generator**

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**Abstract**

A minimum frequency generator of a transceiver system is presented. In a transmitter presented with K bits of parallel data, if a flip condition is determined and selected ones of the K bits are flipped, then the flip condition is signaled in a separately transmitted clock signal. The flip condition can be that all K bits are one or zero. Additionally, the clock signal can indicate whether bits are flipped or not by adjusting the duty cycle of the clock signal.